

IN THE CLAIMS:

1-16. (Cancelled)

17. (Original) An optical pickup that optically reads information that has been recorded on an optical recording medium, comprising:

laser beam exposing means which includes a light source that emits a laser beam and focuses the laser beam on an information recording surface of the optical recording medium;

a first polarizing beam splitter for splitting light reflected back off the information recording surface into first polarized light and second polarized light that is polarized in a different direction to the first polarized light; and

photoelectric conversion means for receiving the first polarized light and the second polarized light and converting the first polarized light and the second polarized light into electrical signals,

wherein the first polarizing beam splitter includes:

a first substrate with a first main surface and a second main surface, a refractive index of the substrate being equal to n where n is a value greater than one;

a first diffractive optical element pattern that is formed on part of the first main surface with a pattern pitch Λ such that $\lambda/n < \Lambda \leq \lambda$, where λ is a wavelength of the reflected light; and

a second diffractive optical element pattern that is formed on one of the first main surface and the second main surface at a predetermined position on an optical path that diffracted light produced by the first diffractive optical element pattern takes within the first substrate.

18. (Original) An optical pickup according to Claim 17, further comprising a second polarizing beam splitter, positioned on an optical path between the light source and the information recording surface, for transmitting the laser beam emitted by the light source and redirecting the reflected light toward the first polarizing beam splitter,

the second polarizing beam splitter including:

a second substrate with a first main surface and a second main surface, a refractive index of the substrate being equal to n' where n' is a value greater than one;

a third diffractive optical element pattern that is formed on part of the first main surface of the second substrate with a pattern pitch Λ' such that $\lambda/n' < \Lambda' \leq \lambda$; and

a fourth diffractive optical element pattern that is formed on one of the first main surface and the second main surface of the second substrate at a predetermined position on an optical path that diffracted light produced by the third diffractive optical element pattern takes within the second substrate.

19. (Original) An optical pickup according to Claim 18,

wherein the first substrate and second substrate are a single substrate, the first diffractive optical element pattern is formed on one of the first main surface and the second main surface at a position that is incident to diffracted light produced by the fourth diffractive optical element pattern.

20. (New) An optical pickup that optically reads information that has been recorded on an optical recording medium, comprising:

a light source unit that emits a laser beam and focuses the laser beam on an information recording surface of the optical recording medium;

5 a first polarizing beam splitter for splitting light reflected back off the information
6 recording surface into first polarized light and second polarized light that is polarized in a
7 different direction to the first polarized light; and

8 photoelectric conversion unit that receives the first polarized light and the second
9 polarized light and converts the first polarized light and the second polarized light into electrical
10 signals,

11 wherein the first polarizing beam splitter includes:

12 a first substrate with a first main surface and a second main surface, a refractive
13 index of the substrate being equal to n where n is a value greater than one;

14 a first diffractive optical element pattern that is formed on part of the first main
15 surface with a pattern pitch Λ such that $\lambda/n < \Lambda \leq \lambda$, where λ is a wavelength of the reflected
16 light; and

17 a second diffractive optical element pattern that is formed on one of the first main
18 surface and the second main surface at a predetermined position on an optical path that diffracted
19 light produced by the first diffractive optical element pattern takes within the first substrate.

1 21. (New) An optical pickup assembly that reads information recorded on an optical
2 recording medium, comprising:

3 a light source that emits a light beam that is focused on the optical recording
4 medium to enable an interaction with information recorded on the optical recording medium;

5 a transparent solid substrate having first and second main surfaces for converting
6 the light from the optical recording medium into polarized light; and

7 a conversion unit that receives light from the optical recording medium and
8 converts the received light into electrical signals that can be processed to provide the recorded
9 information;

10 the transparent solid substrate including

11 a first polarizing diffractive optical element pattern formed in the first
12 main surface with a pattern pitch no greater than a wavelength λ of incident light
13 to provide a first production of zero-order diffracted light and a first order
14 diffracted light; and

15 a second diffractive optical element pattern formed in the second main
16 surface and laterally offset from the first polarizing diffractive optical element to
17 receive only the first production of first order diffracted light, the second
18 diffractive optical element has a pattern pitch greater than the wavelength λ of
19 incident light to provide a second production of a pair of polarized first order
20 diffracted light rays, one of which will be transmitted through the first main
21 surface and the other which will be internally reflected between the first and
22 second main surfaces.

1 22. (New) The optical pickup assembly of Claim 21 wherein the substrate is a plate
2 of glass and the patterns have a rectangular cross section.

1 23. (New) The optical pickup assembly of Claim 21 further including a third
2 diffractive optical element pattern formed in the second main surface and laterally offset from
3 the first diffractive optical element to receive only a first production of negative first-order
4 diffractive light, the second diffractive optical element pattern receiving only the first production

5 of positive first-order diffractive light, the third diffractive optical element has a pattern pitch
6 greater than the wavelength λ of incident light to provide a second production of a pair of
7 polarized first-order diffracted light rays, one of which will be transmitted through the first main
8 surface and the other which will be internally reflected between the first and second main
9 surfaces.

1 24. (New) The optical pickup assembly of Claim 23 wherein the optical element is a
2 polarizing beam splitter.

1 25. (New) The optical pickup assembly of Claim 24 wherein the zero-order
2 diffracted light from the first polarizing optical element is transmitted on the same optical axis as
3 the incident light through the second main surface and the pattern pitch of the second diffractive
4 optical element pattern is the same as the pattern pitch of the third diffractive optical element
5 pattern.